Ammonites from offshore deposits near Bogenfels, Namibia

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Pyritized ammonite nuclei and fragments were recovered by vibracore sampling from offshore deposits near Bogenfels, Namibia. Although these could only be identified at genus level, the association of *Baculites* and *Scaphites* suggest a Coniacian age for these deposits which conforms with the age of the associated foraminifera.

Keywords: ammonite nuclei, Coniacian.

INTRODUCTION

During the course of routine vibracore sampling during diamond exploration off the coast of Namibia, several pyritized ammonite nuclei and fragments were recovered from washed microfossil sieve residues. The vibracore was recovered not far off the Bogenfels coast at 27°30′56.8229″S, 15°18′03.0174″E. The vibracore intersected 0.44 m of section, beneath which was a core cutter sample from 0.44 to 0.66 m. The stratigraphic sequence in descending order is:

1. A thin Holocene veneer at 0.0.
2. A thin unit of fine, clean greenish sand of latest Pleistocene (Eemian-Weichselian) age from 0.0 to 0.32 m.
3. A uniform, stiff, dark grey, fine-grained clay from 0.32 to 0.66 m.

Foraminifera are abundant in the two clay samples studied: Sample Dn 3061 at 0.41–0.44 m and sample Dn 3060 at 0.44–0.64 m. Foraminifera include the benthonic species *Gavelinella plummerae* (Tappan), *Spiroplectinella* cf. *laevis cretosa* (Cushman) and *Nodosaria* cf. *zippei* Reuss, and the planktonic species *Discarinella primitiva* (Dalbiez). This is a typical Late Coniacian assemblage: there is no sign of *Gaudryna 'algulhasensis'*, which would indicate an Early Coniacian age. The pyritized ammonites come from sample Dn 3060. Unusually well-preserved *Gavinella plummerae* from the same sample have been illustrated by MacMillan (2003, fig. 13). The Cretaceous clay samples were washed in warm water through a stainless steel sieve with 63 μm mesh. The ammonite fragments are mostly about the same size as the foraminifera tests, and most were caught in the 250 μm dry sieve fraction.

DESCRIPTION OF AMMONITE MATERIAL

Ammonites from the sieve residues are represented by pyritized internal moulds of ammonitellas, i.e. embryonic shells and straight and curved septate fragments. The straight fragments (Fig. 1A,D) undoubtedly belong to the family Baculitidae (see Klinger & Kennedy 2001 for a review), and, based on the associated Coniacian foraminifera, probably to the genus *Baculites* Lamarck, 1822. During the course of preparing the specimens for coating for SEM examination, a curved specimen representing the uncoiled part of a scaphitid was unfortunately damaged beyond repair. The ammonitellas (Fig. 1B,C,E), one of which (Fig. 1E) shows the primary varix clearly, as well as the globular protoconch (Fig. 1B,C) have a quadrilobate primary suture and represent the early stages of either *Baculites* or a scaphitid genus, probably *Baculites s.s.* According to Landman (1982: 1238; see also Landman 1987: 142, fig. 19), *Scaphites* and *Baculites* ammonitellas differ in the size of the ammonitella angle, i.e. the angle measured from the proseptum to the ammonitella edge (primary varix). In *Baculites* this angle averages 331°, whereas in *Scaphites* it averages 290°. The ammonitella angle of the specimen in Fig. 1E of *c.* 310° suggests that it could belong to the genus *Baculites.* The association of *Baculites* and *Scaphites* suggests, but does not prove unambiguously, a Coniacian age for these deposits, similar to the second division of the Coniacian recorded by Kennedy & Klinger (1975: 278) from KwaZulu-Natal.

SIGNIFICANCE AND DISCUSSION

Even though the ammonite fragments and ammonitellas alone without foraminiferal support do not permit precise dating of these offshore deposits, their presence holds promise for future offshore biostratigraphic work based on ammonite remains in sieve residues (see also Wiedmann 1977). The ammonite remains are of further significance in being the only records of Cretaceous molluscan faunas from the entire Namibian coast apart from a single offshore specimen of *Sphenoceramus* aff. *S. schmidti* (Fig. 2B) and the isolated onshore inlier of the Wanderfeld IV Beds at near Bogenfels (see Haughton 1925; Klinger 1977; Klinger & Kennedy 1989), which has to date only yielded a single ammonite, *Placenticeras merenskyi* Haughton, 1925, and numerous specimens of the ostreid bivalve *Rhynchostreon suborbiculatum* (Fig. 2A) . To this sparse and unique Cretaceous fauna at Wanderfeld IV, Bogenfels may be added a fragment of a ribbed heteromorph ammonite, probably referable to the genus *Glyptoxoceras* (Fig. 2C) found by I.K.M., again in a washed microfossil sample residue. According to the abundant planktonic and benthonic foraminifera and ostracoda, the

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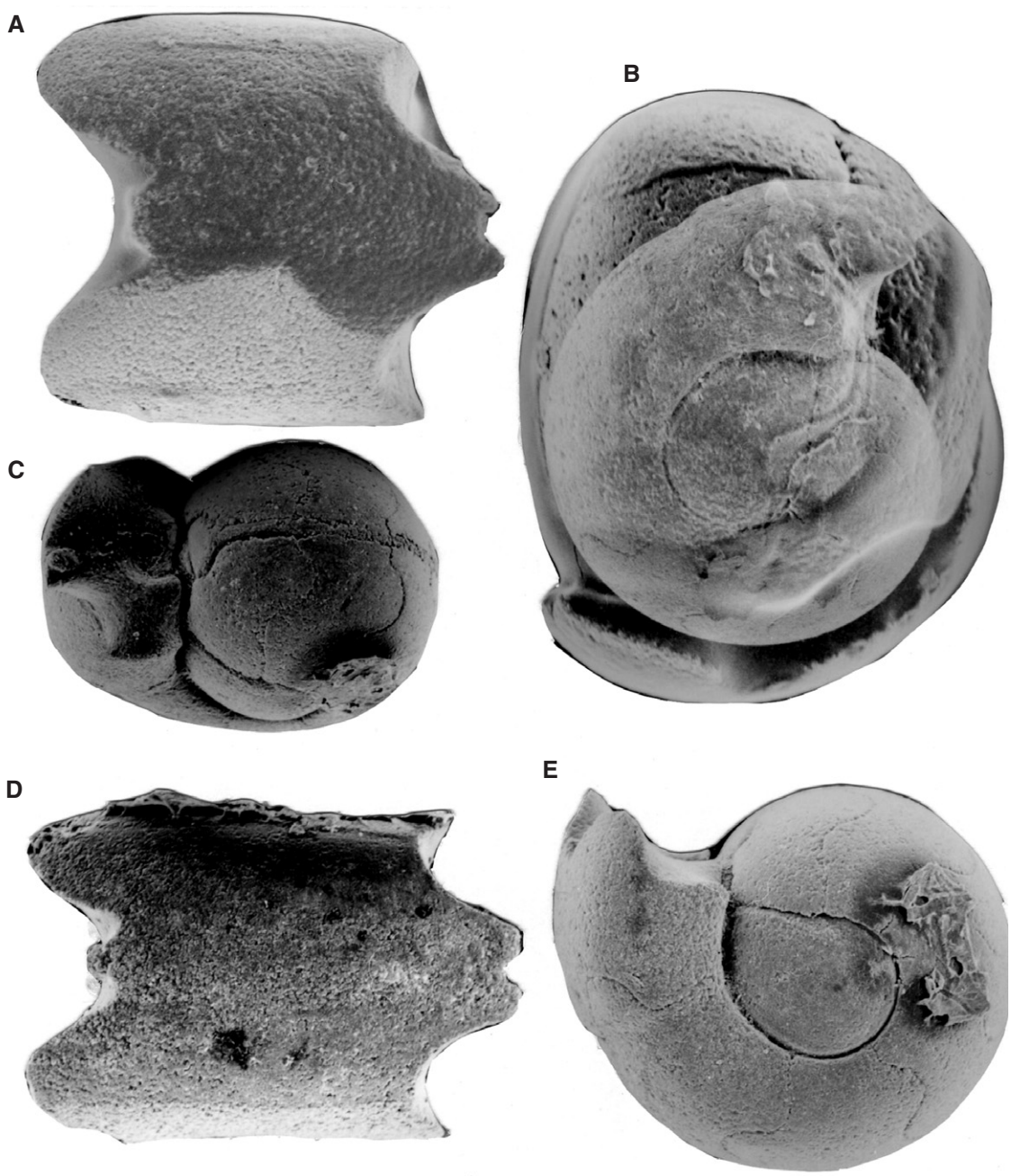

Figure 1. **A**,**D**, *Baculites* sp.: **A**, SAM-PCN22090; **D**, SAM-PCN22091. **B, C, E,** *Baculites* ? sp. ammonitellas: **B**, SAM-PCN22092; **C**, SAM-PCN22093; **E**., SAM-PCN22094; ammonitella showing globular protoconch and primary varix; All from offshore deposits at 27°30′56.8229″S, 15°18′03.0174″E on the Namibian coast. All ×100.

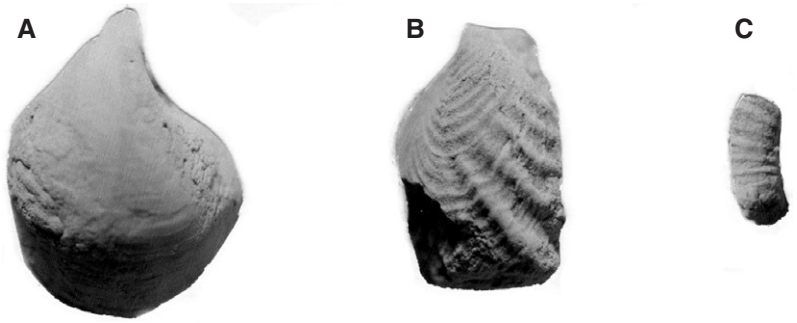

Figure 2. **A**, *Rhynchostreon suborbiculatum*, SAM-PCN22095; **C**, *Glyptoxoceras* ? sp., SAM-PCN22097; both from onshore deposits at Wanderfeld IV, Bogenfels, Namibia. **B**, *Sphenoceramus* aff. *S. schmidti*, SAM-PCN22096 (ex. PCS5504) from dredge sample off Namibian coast at 28°23′S,15°25′E. All ×1.

Wanderfeld IV inlier may be dated as Early Santonian (McMillan 2003: 543).

This material was collected while I.K.M. was employed by De Beers Marine (South Africa). Permission to publish by De Beers is acknowledged. We thank Derek Ohland (Natural History Division, Iziko Museums of Cape Town) for assistance with the SEM images and Kerwin van Wiellinhg with photography.

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